

**What is claimed is:**

1. A permanent magnet rotor magnet positioning and retaining device comprising:

a sleeve having a hollow tubular structure;

- 5 a rotor iron core having a plurality of grooves circumferentially provided in the proper locations inside said sleeve;

a plurality of arc-shaped permanent magnets of alternating poles being provided between said sleeve and said rotor iron core and being separated from one another by said dividers, said arc-shaped permanent magnets each having a cut-off area in the outer perimeter corners of two adjacent permanent magnets so as to form a near triangle-shaped region between two adjacent permanent magnets; and

a plurality of dividers, each being provided between two adjacent permanent magnets of alternating poles, having:

- 15 a base being closely engaged with a groove so that the dividers are secured to the rotor iron core;

a trunk for filling the gap between two adjacent permanent magnets to prevent said permanent magnets from moving in circumferential direction;

- 20 a rim having a near triangle-shaped structure in close contact with said cut-off area so as to prevent permanent magnets from moving in radial direction.

2. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein said rotor iron core is a round steel pole.

- 25 3. A permanent magnet rotor magnet positioning and retaining device of claim 2, wherein said steel pole is silicon steel pole.

4. A permanent magnet rotor magnet positioning and retaining device of claim 2, wherein said rotor iron core has a shaft hole in the center thereof and a plurality of narrow arc-shaped holes circumferentially provided in the proper locations around said shaft hole.

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5. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein said rotor iron core further comprises a plurality of round steel plates being stacked together.
6. A permanent magnet rotor magnet positioning and retaining device of claim 5, wherein said steel plates are silicon steel plates.
7. A permanent magnet rotor magnet positioning and retaining device of claim 5, wherein said steel plates, each having a plurality of elevations on one side and a plurality of corresponding depressions on the opposite side thereof, are stacked one upon another with coincident depressions, so as to provide proper orientation.
8. A permanent magnet rotor magnet positioning and retaining device of claim 5, wherein said steel plate further comprises a shaft hole in the center thereof and a plurality of narrow arc-shaped holes circumferentially provided in the proper locations around said shaft hole.
9. A permanent magnet rotor magnet positioning and retaining device of claim 5, wherein said steel plates are stamp-fabricated.
10. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein four permanent magnets and four dividers are being provided.
11. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein said grooves are rectangle-shaped grooves capable of fitting closely with said bases of rectangle-shaped protrusions so that said grooves and said bases are in tight engagement.
12. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein said grooves are trapezoid-shaped grooves capable of fitting closely with said bases of trapezoid-shaped protrusions so that said grooves and said bases are engaged in sliding fashion.
13. A permanent magnet rotor magnet positioning and retaining device of claim 1, wherein said dividers are made from a hard material having poor or none magnetic conductivity.
14. A permanent magnet rotor magnet positioning and retaining device comprising:

a sleeve having a hollow tubular structure;

a rotor iron core having a plurality of grooves circumferentially provided in the proper locations inside said sleeve;

5 a plurality of arc-shaped permanent magnets of alternating poles being provided between said sleeve and said rotor iron core and being separated from one another by said dividers, said arc-shaped permanent magnets each having a cut-off area in the outer perimeter corners of two adjacent permanent magnets so as to form a near triangle-shaped region between two adjacent permanent magnets; wherein

10 said rotor iron core further comprises a plurality of circumferentially provided grooves for separating two arc-shaped permanent magnets of alternating poles and a plurality of dividers, each being provided between two arc-shaped permanent magnets of alternating poles;

15 said divider, between the rotor iron core and the sleeve, further comprises a base being engaged with a groove so that the dividers are secured to the rotor iron core, a trunk capable of filling the gap between two adjacent permanent magnets to prevent said permanent magnets from moving in circumferential direction, and a near triangle-shaped rim capable of forming tight engagement with said cut-off area so as to prevent  
20 permanent magnets from moving in radial direction.

15. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein said rotor iron core is a round steel pole.

16. A permanent magnet rotor magnet positioning and retaining device of claim 15, wherein said steel pole is silicon steel pole.

25 17. A permanent magnet rotor magnet positioning and retaining device of claim 15, wherein said steel plate further comprises a shaft hole in the center thereof and a plurality of narrow arc-shaped holes circumferentially provided in the proper locations around said shaft hole.

30 18. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein said rotor iron core further comprises a plurality of round steel plates being stacked together.

19. A permanent magnet rotor magnet positioning and retaining device of

claim 18, wherein said steel plates are silicon steel plates.

20. A permanent magnet rotor magnet positioning and retaining device of claim 18, wherein said steel plates, each having a plurality of elevations on one side and a plurality of corresponding depressions on the opposite side thereof, are stacked one upon another with coincident depressions, so as to provide proper orientation.

21. A permanent magnet rotor magnet positioning and retaining device of claim 18, wherein said steel plate further comprises a shaft hole in the center thereof and a plurality of narrow arc-shaped holes circumferentially provided in the proper locations around said shaft hole.

22. A permanent magnet rotor magnet positioning and retaining device of claim 18, wherein said steel plates are stamp-fabricated.

23. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein four permanent magnets and four dividers are being provided.

24. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein said grooves are rectangle-shaped grooves capable of fitting closely with said bases of rectangle-shaped protrusions so that said grooves and said bases are in tight engagement.

25. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein said grooves are trapezoid-shaped grooves capable of fitting closely with said bases of trapezoid-shaped protrusions so that said grooves and said bases are engaged in sliding fashion.

26. A permanent magnet rotor magnet positioning and retaining device of claim 14, wherein said dividers are made from a hard material having poor or none magnetic conductivity.